Christopher S. Boxe

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Education

Ph.D. Environmental Science and Engineering, **Minor** in Geology, California Institute of Technology Jun. 2005
Dissertation Title: Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice
Thesis Advisor: Professor Michael Hoffmann

M.S. Environmental Science and Engineering, California Institute of Technology Jun. 2002

M.S. Planetary Science, California Institute of Technology Jun. 2001

B.S. Chemistry, **Minor** in Math, *magna cum laude* Morehouse College May 1999

Phi Beta Kappa Honors, Morehouse College Mar. 1998

Experience

Jet Propulsion Laboratory Research Scientist, NASA-JPL Oct. 2008 – present
Interdisciplinary focus on regional and global biochemical and physical evolution of planets on geological and shorter timescales by modeling, laboratory, and remote sensing techniques.

African American Resource Team (AART), Jet Propulsion Laboratory Nov. 2008 – present
Contributing to JPL's Diversity Programs Initiative, which seeks to foster an inclusive environment, where the differences and similarities of individuals are valued and respected, ensuring full utilization of the talents and capabilities of our diverse workforce.

Jet Propulsion Laboratory Postdoctoral Scholar, NASA-JPL Jan. 2008 – Oct. 2008
Postdoctoral matriculation in the Planetary Science and Life Detection Group in JPL's Earth and Space Science Division. Conducting a quantitative budget analysis of nitrogen, carbon, and water on Mars, Earth, and Venus via numerical modeling techniques to gain insight into their comparative evolution. In parallel, several projects are being conducted to investigate the possible effects of heterogeneous photochemistry on the Martian atmosphere and the effect of implementing new gas phase CO_2-related and HNO_3-related chemical reactions; these investigations are being done by coupled 1-D and multiphase modeling techniques.

Jet Propulsion Laboratory Speakers Bureau, NASA-JPL 2008 – present
On a voluntary basis gives scientific presentations basis to elementary schools and professional

organizations about work done at JPL.

Caltech Consulting Club Volunteer 2008 – present
Participates in focus sessions for consulting firms to provide statistical consumer behavior data.

Arctica Research Project for Urban Youth, NASA-JPL 2007 – present
Collaborative practical science projects and field trips with a multitude of select elementary, junior high, and high schools in Los Angeles with the main goal of gearing underrepresented peoples towards the hard sciences (*i.e.*, with a special emphasis on Earth and Space Sciences).

Oak Ridge Associated Universities/ NASA Postdoctoral Program Fellow, NASA-JPL 2006 – 2008
Postdoctoral matriculation in the Lab Studies and Modeling Group in JPL's Earth and Space Science Division. Involved in planetary ice surface evolution, cirrus cloud chemistry and microphysics, and modular multiphase modeling. Particle size determination used to quantify relative ages of the surfaces of icy moons. Secondly, using spectroscopic techniques, investigated the interaction of trace gases on cirrus clouds. Thirdly, along with another postdoctoral scholar, created the first multiphase modular model to study trace pollutant effects on air quality and snow/ice chemistry in the polar regions.

Program Assistant, Caltech MURF (Minority Undergraduate Research Fellows) 2001 – 2006
Organized academic and social activities for undergraduates during the summer research program.

Environmental Science and Engineering Graduate Research Assistant, Caltech 2001 – 2005
Elucidation of physicochemical, photochemical, and kinetic pathways for nitrogen oxide industrial pollutants in the polar regions. Specifically, I investigated such phenomenon through laboratory techniques utilizing: wet chemical analysis, oxygen and nitrogen isotopic analysis via multiple collector mass spectrometry, laser-induced fluorescence spectroscopy, two-photon laser-induced fluorescence spectroscopy, and NMR spectrometry. These investigations were carried out at Caltech in collaboration with faculty at Georgia Tech, University of California San Diego, and University of California Berkeley.

Instructor, Caltech YESS (Young Engineering and Science Scholars) 2001 –2001
Taught high school students the practical uses and benefits of utilizing wind turbines and the fundamental physics governing how they operate.

Geology and Planetary Science Graduate Research Assistant, Caltech 1999 – 2001
1-D photo-chemical modeling of extrasolar planetary atmospheres and putative infrared quantum-mechanical calculations relevant to terraforming the Martian atmosphere with super greenhouse gases.

Voluntary Teaching at Los Angeles High Schools 2006
Taught high school students elementary chemistry governing the production of smog in urban environments.

Graduate Student Recruiter, Caltech/NASA-JPL 1999 – present
Recruited graduate students for Caltech's graduate program.

Research Assistant, Morehouse College 1997 –1999

Extracted essential oils from the plant species *Origanum vulgare* by means of carbon dioxide (CO_2) extraction.

NASA-McNair Research Assistant, Morehouse College 1997 – 1999

Investigated molecular nitrogen (N_2) and molecular hydrogen (H_2) adsorption and absorption on aluminum oxide (Al_2O_3) surfaces via diffuse reflectance infrared fourier transform (DRIFT).

Publications (***in press***, ***in print, in submission, or in review***) *Indicates co-first authors

(29). Aura Satellite Observations and GEOS-Chem Model Simulations of the December 2006 Australian Fires
M. Luo, C. S. Boxe, J. Jiang, R. Nassar, J. Logan, and N. Livesey
Atmospheric Chemistry and Physics-Discussions, in submission.

(28) The effect of the Novel HNO_3(g) Production Channel at South Pole, Antarctica
C. S. Boxe, P. Hamer, W. Ford, M. Hoffmann, J. Worden, and K. Bowman,
Environmental Research Letters, in submission.

(27). Investigating the Photo-oxidative Production of HCHO in the Snowpack at the South Pole, Antarctica
P. D. Hamer, D. E. Shallcross, A. Yabushita, and C. S. Boxe
Environmental Chemistry, in submission.

(26). Global Atmospheric Effects via the University of Irvine-Chemical Transport Model (UCI-CTM) of the Novel HNO_3(g) Production Channel Constrained by A-Train Satellite Data
C. S. Boxe, J. Neu, and J. Worden
Journal of Geophysical Research, in submission.

(25). Validation of Northern Latitude Tropospheric Emission Spectrometer Stare Ozone Profiles with ARC-IONS Sondes during ARCTAS
C. S. Boxe, *et al.*,
Atmospheric Chemistry and Physics-Discussion, in submission.

(24) Photochemical Laboratory Studies of Organic and Inorganic Molecules on Ice and Snow Crystals Relevant to Polar Chemistry
C. S. Boxe,* M. I. Guzman,* A. Grannas, M. R. Hoffmann, P. B. Shepson, W. Simpson, and R. Honrath
Chemical Reviews, proposal accepted-manuscript in submission.

(23). Thin Liquid Films on Mars and Their Implications
C. S. Boxe,* K. P. Hand,* K. Nealson, Y. L. Yung, M. Allen, S. Sander, and C. Sotin
Proceedings of the National Academy of Sciences of the United States of America, in submission.

(22). Thin Liquid Films on Mars
C. S. Boxe,* K. P. Hand,* K. Nealson, A. Saiz-Lopez, M. I. Guzman, A. S. Yen, Y. L. Yung, M. Allen, S. Sander, and C. Sotin
Proceedings of the National Academy of Sciences of the United States of America, in submission.

(21). Influence of thin liquid layers on polar ice chemistry: implications for Earth and planetary science
C. S. Boxe* and A. Saiz-Lopez*
Polar Science, Volume 3, 73-81, (2009).

(20). A mechanism for biologically-induced iodine emissions from sea-ice
A. Saiz-Lopez*, C. S. Boxe*, R. Sander, and L. Carpenter
Atmospheric Chemistry and Physics-Discussions, in press.

(19). Multiphase modeling of nitrate photochemistry in the quasi-liquid layer (QLL): implications for NO_x release from the Arctic and coastal Antarctic snowpack
C. S. Boxe* and A. Saiz-Lopez*
Atmospheric Chemistry and Physics, Volume 8, 4855-4864 (2008).

(18). Multiphase modeling of nitrate photochemistry in the quasi-liquid layer (QLL): implications for NO_x release from the Arctic and coastal Antarctic snowpack
C. S. Boxe* and A. Saiz-Lopez*
Atmospheric Chemistry and Physics-Discussions, Volume 8, 6009-6034 (2008).

(17). A mechanism for biologically-induced iodine emissions from sea-ice
A. Saiz-Lopez* and C. S. Boxe*
Atmospheric Chemistry and Physics-Discussions, Volume 8, 2953-2976 (2008).

(16). An overview of snow photochemistry: evidence, mechanisms and impacts
A. M. Grannas, A. E. Jones, J. Dibb, M. Ammann, C. Anastasio, H. J. Beine, M. Bergin, J. Bottenheim, C. S. Boxe, et al.,
Atmospheric Chemistry and Physics, Volume 7, 4165--4283 (2007).

(13). A Review of Snow Photochemistry: evidence, mechanisms, and impacts
A. M. Grannas, A. E. Jones, J. Dibb, M. Ammann, C. Anastasio, H. J. Beine, M. Bergin, J. Bottenheim, C. S. Boxe, et al.,
Atmospheric Chemistry and Physics-Discussions, Volume 7, 4329-4373 (2007).

(15). Grain Sizes and Surface Areas, and Porosities of Vapor-Deposited H_2O Ices Used to Simulate Planetary Icy Surfaces
C. S. Boxe, Leu, M. T., Bodsgard, B. R., and W. Smythe
Journal of Colloid and Interface Science, Volume 309, Issue 2, Pages 412-418, MAY 15 (2007).

(14). Acidity of Frozen Electrolyte Solutions
C. Robinson, C. S. Boxe, M. I. Guzman, A. J. Colussi, and M. R. Hoffmann
Journal of Physical Chemistry B, 110 (15): 7613-7616 APR 20 (2006).

(13). Kinetics of Gaseous NO and NO_2 Evolution from Illuminated Frozen Nitrate Solutions
C. S. Boxe, A. J. Colussi, M. R. Hoffmann, I. Perez, J. G. Murphy, and R. C. Cohen
Journal of Physical Chemistry A, 110 (10): 3578-3583 MAR 16 (2006).

(12). Photochemical Production and Release of Gaseous NO_2 from Nitrate-doped Water Ice
C. S. Boxe, A. J. Colussi, M. R. Hoffmann, J. Murphy, P. Wooldridge, T. Betram, and R. C. Cohen
Journal of Physical Chemistry A, 109 (38): 8520-8525 SEP 29 (2005).

(11). Oxygen Isotopes Fractionation in the Photodecomposition of Nitrate in Water and Ice
J. McCabe, C. S. Boxe, A. J. Colussi, M. R. Hoffmann, and M. Thiemens.
Journal of Geophysical Research-Atmospheres, Vol. 110, No. D15, D15310, 10.1029/2004JD005484, 13 August (2005).

(10). Multiscale Ice Fluidity in NOx Photodesorption from Frozen Nitrate Solutions
C. S. Boxe, A. J. Colussi, M. R. Hoffmann, D. Tan, J. Mastromarino, A. T. Case, S. T. Sandholm, and D. D. Davis
Journal of Physical Chemistry A, 107 (51): 11409-11413 DEC 25 (2003).

(9). Monotonic Increase of Nitrite Yields in the Photolysis of Nitrate in Ice and Water between 238 and 294 K
Y. Dubowski, A. J. Colussi, C. S. Boxe, and M. R. Hoffmann
Journal of Physical Chemistry A, 106 (30): 6967-6971 AUG 1 (2002).

(8). Keeping Mars Warm with New Super Greenhouse Gases
M. F. Gerstell, J. S. Francisco, Y. L. Yung, C. S. Boxe, and E. T. Aaltonee
Proceedings of the National Academy of Sciences of the United States of America, 98 (5): 2154-2157 FEB 27 (2001).

Publications (***in prep – top priority***) *Indicates co-first authors

(7). The Effect of the Novel HNO_3(g) Production Channel over the U.S. using WRF-Chem
C. S. Boxe, W. Ford, M. R. Hoffmann, and J. Worden
Geophysical Research Letters, in preparation.

(6). Atmospheric Chemistry on Mars Revisited
C. S. Boxe,* J. S. Francisco,* F. Lefevre, F. Forget, M. I. Guzman, M. Allen, S. P. Sander, H. Nair, A. Saiz-Lopez, and Y. L. Yung.
Science, in preparation.

(5). New Reaction Pathways Affecting Atmospheric CO_2 on Mars via the Pathway Analysis Program (PAP)
J. Stock, J. L. Grenfell, and C. S. Boxe
Nature Geoscience, in preparation.

(4). Low Temperature UV-VIS Spectral Analysis of Benzene, Ethyl Benzene and Toluene
C. S. Boxe,* R. Hodyss,* P. Johnson, L. Lane, and I. Kanik
Journal of Physical Chemistry A, in preparation.

(3). Tropospheric Emission Spectrometer Version 4 Temperature Retrievals Compared to Aircraft and Sondes
R. L. Herman, C. S. Boxe, *et al.*,
Journal of Geophysical Research, in preparation.

Publications (***in prep, in submission, or in review – lower priority***) *Indicates co-first authors

(2). A Review of Lab Studies Simulating Radiation Bombardment on Planetary Icy Surfaces
C. S. Boxe, G. Orzechowska, P. V. Johnson, R. P. Hodyss, A. Saiz-Lopez, I. Kanik, and Y. L. Yung
Annual Review, in preparation.

(1). Modeled-Derived True Surface NO_x Fluxes from the Snowpack
H. J. Beine, A. Saiz-Lopez, and C. S. Boxe
Geophysical Research Letters, in preparation.

Invited Talks, Conference Papers, Poster Presentations, & Outreach Activities

C. S. Boxe, "Validation of northern latitude Tropospheric Emission Spectrometer stare ozone profiles with ARC-IONS sondes during ARCTAS Paper," American Geophysical Union, San Francisco, California, Fall Meeting 2009, oral presentation.

C. S. Boxe, "Interpretation of Aura Satellite Observations of CO and Aerosol Index related to the December 2006 Australia Fires," American Geophysical Union, San Francisco, California, Fall Meeting 2009, oral presentation.

C. S. Boxe, "Thin Liquid Films on Mars: implications for life," USC Department of Earth Sciences," November 2nd, 2009.

C. S. Boxe, "Thin Liquid Films on Mars: implications for life," Gordon-CenSSIS/ALERT Research & Industrial Colloboration Conference (RICC), October 27th-28th, 2009.

C. S. Boxe, Northeastern ADVANCE "Interdisciplinary Networking in Sensing and Imaging Systems" A Workshop to Promote Diversity and Gender Balance for Prospective Faculty, October 25th-26th, 2009.

M. Barth, J. Lee, C. Boxe, J. Worden, and A. Hodzic, "Modeling Study of Thunderstorm Effects on the Upper Troposphere During the Early Stages of the 2006 North American Monsoon," The Extra-tropical UTLS: Observations, concepts & future directions, Community workshop at NCAR, Boulder, CO, October 19th-22nd, 2009.

C. S. Boxe, J. Neu, and J. Worden, "Global Effects of the Novel HNO_3(g) Production Channel and the Effects of Scavenging Constrained by A-Train Satellite Data," The Extra-tropical UTLS: Observations, concepts & future directions, Community workshop at NCAR, Boulder, CO, October 19th-22nd, 2009.

C. S. Boxe, Annual Donator for extracurricular sports activities for select students in Pasadena, California.

C. S. Boxe, Annual Donator for the tuition of high school students in Kingston, Jamaica.

C. S. Boxe, Annual Donator to Classical KUSC 91.5 fm radio broadcast service of the University of Southern California.

C. S. Boxe, Earth Scientist Volunteer at JPL's Open House, Education Office, May 2n4-3rd, 2009.

C. S. Boxe, "The Role of Thin Liquid Films and Their Implications," Guest Lecture for Geobiology/Astrobiology course at USC's Earth Science Department, April 28th, 2009.

C. S. Boxe donated honorarium received from guest speaker for Earth Day at Citrus College's Center For Initiative (CFI), "Global Warming: Fact, Myth, or Hypothesis," Glendora, CA April 22nd, 2009 to Armory's Center for the Arts City of Pasadena Greening the Earth Day & the Armory's Family Festival, April 25th, 2009.

C. S. Boxe (with honorarium), Invited guest speaker for Earth Day at Citrus College's Center For Initiative (CFI), "Global Warming: Fact, Myth, or Hypothesis," Glendora, CA April 22nd, 2009.

C. S. Boxe and C. Paterson, Invited guest speakers Arts Center Open Science Center Salon, "Up in the Air: constraints for life on Mars sought through atmospheric models and thermodynamic calculations," at University of California, Broad Art Science Center and Lab, Los Angeles CA, April 17th, 2009.

C. S. Boxe, Invited guest speaker for "Career and Life Planning" at Citrus College, Citrus College, Glendora, CA, March 19th, 2009.

C. Paterson and C. S. Boxe, "Life as We Know It?" Birth/Day: Origins, Temporality, Hybridity – 'How does newness come into the world? How is it born? Of what fusions, translations, conjoining is it made?' Salman Rushdie, The Satanic Verses, Visual Studies Conference, University of California, Irvine, CA, March 6-7th, 2009.

C. S. Boxe, "Validation of Tropospheric Emission Spectrometer (TES) nadir stare ozone profiles using ozonesonde measurements during Arctic Research on the Composition of the Troposphere from Aircraft and Satellites (ARCTAS)," 26th Informal Symposium on Kinetic and Photochemical Processes in the Atmosphere, University of California, Riverside, CA, March 5th, 2009.

C. S. Boxe, "Validation of Tropospheric Emission Spectrometer (TES) nadir stare ozone profiles using ozonesonde measurements during Arctic Research on the Composition of the Troposphere from Aircraft and Satellites (ARCTAS)," TES Science Team Meeting, The University Corporation for Atmospheric Research (UCAR) – National Center for Atmospheric Research (NCAR) Foothills Laboratory, February 23-25th, 2009.

C. S. Boxe, "Applications of Ice Photochemistry to Earth Science Problems," Ice Labs Workshop, NASA-JPL, February 2nd, 2009.

C. S. Boxe, "Validation of Tropospheric Emission Spectrometer (TES) nadir stare ozone profiles using ozonesonde measurements during Arctic Research on the Composition of the Troposphere from Aircraft and Satellites (ARCTAS)," ARC-IONS Data Workshop, Wycliffe College, University of Toronto, January 7-8th, 2009.

C. S. Boxe, "Chemistry of Ice and Snow: implications for planetary science," Harvard's Engineering and Applied Sciences Atmospheric Sciences Seminar, October 24th, 2008.

C. S. Boxe, "Academic Career Path," Morehouse College's Ronald E. McNair Scholars, Atlanta, Georgia, October 7th, 2008.

C. S. Boxe, "Heterogeneous Snow Chemistry and its Relation to finding life on Mars," Morehouse College's Chemistry Department, Atlanta, Georgia, October 7th, 2008.

C. S. Boxe, "Academic Career Path – Self-Empowerment Through Research," Keynote Speaker for Morehouse College's 3rd Annual Research – Enrichment Awards, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Heterogeneous Snow Chemistry," Morehouse College's Math Department, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Academic Career Path," Morehouse College's Chemistry Department, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Academic Career Path," Morehouse College's Biology Department, Atlanta, Georgia, October 6th, 2008.

C. S. Boxe, "Climate Change: Fact or Fiction?" Camp Mariposa Girl Scouts, Altadena, California, September 30th, 2008.

C. S. Boxe, "Academic Career Path," The Scientific Empowerment Movement (SEM), UCLA, Los Angeles, California, September 27th, 2008.

C. S. Boxe, "The Academic Career Path," Mt. San Antonio College's Inland Valley Black College Summit, Industry, California, September 13th, 2008.

C. S. Boxe, A. Saiz-Lopez, A. S. Yen, M. I. Guzman, Y. L. Yung, M. Allen, C. Sotin, Heterogeneous Photochemistry on Mars's Surface," Earth and Space Science Division, Jet Propulsion Laboratory, NASA-JPL's Postdoctoral Research Day, August 26th, 2008.

C. S. Boxe, "Possible Environments for Life on Mars," NASA-JPL's Minority Education Initiatives, June 25th, 2008.

C. S. Boxe, Volunteer at the Child Educational Center's 19th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June14th, 2008.

C. S. Boxe, "Ask a Scientist Guy," Volunteer at JPL's Open House, Education Office, May 3rd-4th, 2008.

C. S. Boxe, Arctica Research Project for Urban Youth, NASA-JPL, "Creating an Ice Rendevous," MOCA/LACMA Allan Kaprow Fluids Reinvention Site, MacArthur Park Lakeside, April 27th, 2008.

C. S. Boxe, "Global Warming: fact or fiction," Keynote Speaker at Earth Day, Citrus College, Glendora, CA, April 22nd, 2008.

Saiz-Lopez, A., Boxe, C. S., Sander, S. P., Chance, K., Kurosu, T. P., Liu, X., Mahajan, A., Plane, J..M. C. "Iodine chemistry in the polar boundary layer," EGU General Assembly 2008, AS3.14, lecture room Lecture Room 1 on Thursday, 17 April 2008, 13:30.

C. S. Boxe, "The Life Journey of an Atmospheric Scientist," Careers in Science Night, Garfield Elementary School, Alhambra, CA, April 16th, 2008.

C. S. Boxe , "Multiphase Modeling of Nitrate Photochemistry in the Polar Regions," Duke's Nicholas School of the Environment and Earth Sciences Earth and Ocean Sciences Division, March 18th, 2008.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer: Implications for NO_x Release from the Arctic and Coastal Antarctic Snowpack," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), oral presentation.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer: Implications for NO_x Release from the Arctic and Coastal Antarctic Snowpack," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), poster presentation.

A. Saiz-Lopez and C. S. Boxe, "Iodine in the Troposphere," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), oral presentation.

A. Saiz-Lopez and C. S. Boxe, "Iodine in the Troposphere," 25th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere (2007), poster presentation.

A. Saiz-Lopez and C. S. Boxe, "Iodine: The Missing Halogen of Polar Tropospheric Chemistry," American Geophysical Union, San Francisco, California, Fall Meeting 2007, invited oral presentation.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer: Implications for NO_x Release from the Arctic and Coastal Antarctic Snowpack," American Geophysical Union, San Francisco, California, Fall Meeting 2007, oral presentation.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," University of Florida, Department of Chemistry, Physical Chemistry Seminar Series, December 4th, 2007.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Colorado State University, Atmospheric Science Department Colloquium, November 29th, 2007.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Columbia University-Lamont Doherty Earth Observatory Seminar Series, October 26th, 2007.

C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Columbia University's Earth's Institute's IGERT Joint Program in Applied Mathematics and Earth and Environmental Sciences Fall 2007 Colloquium, October 25th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," Earth and Space Science Division, Jet Propulsion Laboratory, NASA September 17th, 2007.

C. S. Boxe and A. Saiz-Lopez, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer (QLL): implications for NO_x release around coastal Antarctica," Gordon Research Conference on Atmospheric Chemistry, Big Sky, Montana, August 26th – 31st, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine Explosion during Antarctic Springtime," Earth and Space Science Division, Jet Propulsion Laboratory, NASA-JPL's Postdoctoral Research Day, August 28th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," Gordon Research Conference on Atmospheric Chemistry, Big Sky, Montana, August 26th – 31st, 2007.

C. S. Boxe, "Life Journey of a Young Scientist," NASA's Jet Propulsion Laboratory, Arctica Research Alliance -- Summer Campers from MacArthur Park, Pasadena, CA, July 31st, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," NASA's Jet Propulsion Laboratory, Planetary Ices Seminar Series, Pasadena, CA, July 13th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer (QLL): implications for NO_x release around coastal Antarctica," NASA's Jet Propulsion Laboratory, Planetary Ices Seminar Series, Pasadena, CA, July 20th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, June 26th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Multiphase Modeling of Nitrate Photochemistry in the Quasi-Liquid Layer (QLL): implications for NO_x release around coastal Antarctica," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, June 26th, 2007.

C. S. Boxe, Volunteer at the Child Educational Center's 18th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June16th, 2007.

A. Saiz-Lopez and C. S. Boxe, "Iodine explosion during Antarctic springtime," Minority Education Initiative Summer Internship Program, Jet Propulsion Laboratory, NASA, June 13th, 2007.

A. Saiz-Lopez and C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, NASA "Biologically-Induced Iodine (I_2) Release from Sea-Ice During Springtime in Antarctica," The Discipline Program Scientist Monthly Planetary Science Highlight, May 18th, 2007.

C. S. Boxe, "Careers in Earth Science," Keynote Speaker at Earth Science Career Day, Citrus College, Glenora, CA April 19nd, 2007.

C. S. Boxe, "Fostering Your Scientific Curiosity," Keynote Speaker at Earth Science Career Night for High School Students at JPL, April 5th, 2007.

C. S. Boxe, FOCUS Fellow, FOCUS 2007, Georgia Institute of Technology, January 11th – 14th, 2007.

C. S. Boxe, "Grain Sizes, Surface Areas, and Porosities of Vapor-Deposited H_2O Ices Used in the Temperature Range 83.5 – 261 K: Simulation of Surfaces of Planetary Icy Surfaces," American Geophysical Union, San Francisco, California, Fall Meeting 2006, poster presentation.

G. E. Orzechowska, R. P. Hodyss, P. V. Johnson, J. D. Goguen, A. L. Lane, C. S. Boxe, J. Kirschvink Y. L. Yung, and I. Kanik, "Potential for Organic Chemical Evolution on Enceladus," American Geophysical Union, San Francisco, California, Fall Meeting 2006, poster presentation.

W. D. Smythe, M. T. Leu, C. S. Boxe, B. R. Bodsgard, "Energy Transport and Crystal Growth in Frost Flowers," American Geophysical Union, San Francisco, California, Fall Meeting 2006, poster presentation.

C. S. Boxe, "A Multi-Component View of Ice/Snow: Implications of its pH for the Overlying Boundary Layer/Planetary Science Heterogeneous Chemistry," University of New Hampshire, Institute for the Study of Earth, Oceans, and Space, Science Seminar Series, November 16th, 2006.

C. S. Boxe, "A Journey from Terrestrial Photochemistry and Kinetics to Planetary Science Microphysics," Georigia Institute of Technology, School of Earth and Atmospheric Sciences, Atlanta, GA, School of Earth and Atmospheric Sciences Seminar Series, September 29th, 2006.

C. S. Boxe, "Grain Sizes, Surface Areas, and Porosities of Vapor-Deposited H_2O Ices Used in the Temperature Range 83.5 – 261 K: Simulation of Surfaces of Icy Satellites and Terrestrial Snow-Covered Regions," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, September 26th, 2006.

C. S. Boxe, A. J. Colussi, M. R. Hoffmann, I. M. Perez, J. G. Murphy, R. C. Cohen, "Kinetics of NO and NO_2 Evolution from Illuminated Frozen Nitrate Solutions,"232nd American Chemical Society National Meeting & Exposition, September 10-14th, 2006 San Francisco, CA.

C. S. Boxe, "Global Warming: Fact, Hypothesis, or Myth?," NASA's Jet Propulsion Laboratory, Pasadena, California, SURF, MURF, Space Grant, USRP, PGGURP, and CURE summer seminar series, June 21st, 2006.

C. S. Boxe, Volunteer at the Child Educational Center's 17th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June17th, 2006.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H_2O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions," Michigan Technological University, Environmental Science and Engineering and Geological/Mining Engineering and Sciences Departments, May 11th, 2006.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H_2O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions," Massachusetts Institute of Technology, Civil and Environmental Engineering Department, April18th, 2005.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H_2O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions," Reed College, Portland, Oregon, Chemistry Department, April10th, 2006.

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C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice/ Grain Sizes and Surface Areas of H_2O Ices Used to Simulate Surfaces of Icy Moons and Terrestrial Ice/Snow-Covered Regions," Michigan Technological University, Environmental Science and Engineering and Chemistry Departments, February 6th, 2006.

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C. Robinson, C. S. Boxe, M. I. Guzman, A. J. Colussi, and M. R. Hoffmann, "^{19}F NMR Probing the Acidity of Frozen Electrolyte Solutions," OASIS Workshop, Sept. 19th-20th 2005, Toronto, Canada.

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C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice," NASA's Jet Propulsion Laboratory, Planetary Ices Seminar Series, Pasadena, California, June 24th, 2005.

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C. S. Boxe, Volunteer at the Child Educational Center's 16th Annual Wine Tasting Benefit and Auction, Avery House, Caltech, June18th, 2005.

C. S. Boxe (with honorarium), "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice," California State University, Los Angeles, California, Chemistry Department, June 3rd, 2005.

C. S. Boxe, "Nitrate Photochemistry and Interrelated Chemical Phenomena in Ice," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, May 24th, 2005.

C. S. Boxe, "Smog Production in Los Angeles," Centinela Valley Union High, Lawndale, CA, March 15th, 2005.

McCabe, J. R., Boxe, C. S., Colussi, A., J., Hoffmann, M. R., Thiemens, M. H., "Multiple Oxygen Isotope Photochemistry of Nitrate in Ice," American Geophysical Union, San Francisco, California, Fall Meeting 2004, abstract #A11B-0045.

C. S. Boxe, "Explication of the Chemical and Kinetic Processes Governing Nitrate Photodegradation in Ice Matrices," California Institute of Technology, Geological and Planetary Science Division, Pasadena, CA, Yuk L. Yung Seminar Series, July 8th, 2003.

C. S. Boxe, "Photolysis in Ice Matrices: Implications for a Liquid-like Reaction Medium," NASA's Jet Propulsion Laboratory, Planetary Ices Seminar Series, May 6th, 2003.

C. S. Boxe, Y. L. Yung, M. A. Allen, R. A. West, J. I. Moses, "Hydrocarbon Chemistry in the Atmospheres of Six Extrasolar Planets," DPS Pasadena, California Meeting 2000, 23-27 October 2000.

Press Releases & Special Features

C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, Biographic Feature in Marquis Who's Who in America 2010.

C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, "Good and Bad Ozone," NASA-JPL Main Website Blog Feature, April-May 2009.

C. S. Boxe and A. Saiz-Lopez, Earth and Space Science Division, Jet Propulsion Laboratory, NASA, "NASA Polar Chemists Snag a Mean, Green, Ozone-Eating Machine," NASA-JPL Main Website Web Feature, Coming Soon, 2009.

C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, "The Chemistry of Snow," NASA-JPL Main Website Blog Feature, August-September 2008.

C. S. Boxe, One of the first Black Atmospheric and Planetary Scientist, Nansemond River High School, Suffolk, Virginia, Special Feature for Black History Month, February, 2008.

C. S. Boxe, One of the first Black Atmospheric Scientists, National Hills Elementary School, Augusta, Georgia, Special Feature for Black History Month, February, 2008.

C. S. Boxe, The Journey of a Young Black Scientist, George Washington High School, Philadelphia, Pennsylvania, Special Feature for Black History Month, February, 2008.

A. Saiz-Lopez and C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, NASA, NASA-JPL Universe, October, 2007, "Postdoc Research Showcased: Iodine Explosion during Antarctic Springtime."

A. Saiz-Lopez and C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, NASA "Surface Chemistry and Physics: Implications for the future of Terrestrial Polar Science and Planetary Science," NASA Science and Technology Solar System Exploration Science Highlight, 2007, NASA Nationwide.

A. Saiz-Lopez and C. S. Boxe, Earth and Space Science Division, Jet Propulsion Laboratory, NASA "Iodine Explosion During Antarctica Springtime," NASA Science and Technology Solar System Exploration Science Highlight, 2007, NASA Nationwide.

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C. S. Boxe, “Summer Scenes at Caltech,” Caltech 336, September 2001.

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C. S. Boxe, “Morehouse Graduate Heads to Caltech,” Morehouse College News, May 1999.

Honors, Awards, and Proposal Funding

2010 Research and Technology Development Innovative Spontaneous Concept	$30,000
JPL Early Career Hire	Oct. 2008 – Present
JPL Postdoctoral Scholar	Jan. 2008 – Oct. 2008
ORAU-NASA-JPL Postdoctoral Scholar	Jan. 2006 – Jan. 2008
Most Intellectual Poster at JPL Postdoctoral Research Day	August 28th, 2007
Carl Storm Underrepresented Minority Fellowship	August 2007
Atmospheric Chemistry Gordon Research Conference Attendee	Aug. 26th – Aug. 31st 2007
FOCUS Fellow, GA Tech FOCUS 2007	Jan. 11th – 14th, 2007
Faces of JPL	May 2007 – Present
NSF CMS/BES (WEE '06) Scholar	Mar. 5th – 8th, 2006
SOLAS Summer School Scholar	Aug. 29th – Sept. 10th 2005
Gordon and Betty Moore Fellow, California Institute of Technology	2003 – 2005
James Irvine Fellow, California Institute of Technology	1999 – 2003
Chemistry Honors, Morehouse College	May 1999

Technical Skills

- Matlab
- Sigma Plot
- Solid State NMR
- VUV Spectroscopy
- Flow Tube Reactors
- Chemiluminescence
- Ion Chromatography
- GEOS-Chem Utilization
- Laser-induced Fluorescence
- UV-VIS Spectrophotometry
- Two-photon Laser-induced Fluorescence
- Brunauer, Emmett, and Teller (BET) analysis
- Environmental Scanning Electron Microscopy (ESEM)
- Electron-Impact Ionization Mass Spectrometry
- 1-D photochemical modeling of Mars and Venus
- 1-D parameterized crust-mantle numerical modeling of volatile gas exchange and life signature budget analyses
- 1-D modeling of troposphere and 0-D Multi-phase modeling (e.g., aerosols to gas phase and condense (sea-ice, snowpack, seawater) to gas phase) via Visual Basic
- Regional and global modeling of Earth with in situ data from satellites, aircraft, and sondes

References

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